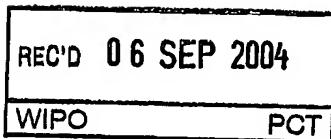




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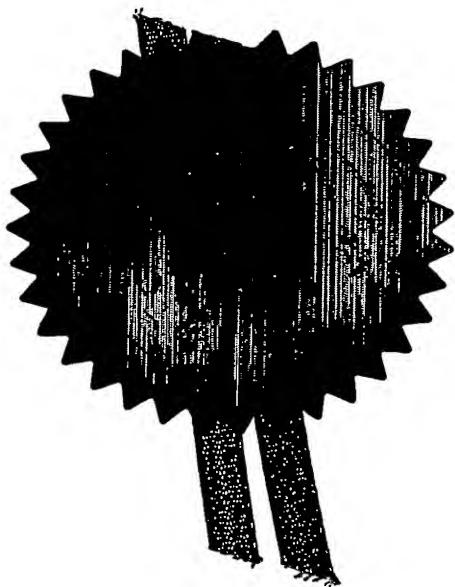
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## 3. Full name, address and postcode of the or of each applicant (underline all surnames)

FlexLink Components AB  
SE-415 50 Goteborg  
SWEDEN

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

Sweden

08259198001

## 4. Title of the invention

A VARIABLE CAPACITY STORE FOR ELONGATED ARTICLES

## 5. Name of your agent (if you have one)

Marks & Clerk  
Alpha Tower  
Suffolk Street Queensway  
Birmingham B1 1TT  
England

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**A variable capacity store for elongated articles****TECHNICAL FIELD**

The present invention relates to a variable capacity store for elongated articles. In particular the invention relates to a variable capacity store of the FIFO type, where goods stored in the reservoir leave the store in the same order as they were introduced. Furthermore the invention relates to the type of variable capacity store which includes an endless conveyer being subdivided into an active path, which is capable of transporting goods and a passive path functioning as a store for the endless conveyor. In this type of variable capacity stores, the capacity is altered by changing the length of the active path by removing part of the active path from the passive path or by introducing part of the passive path into the active path.

**15 BACKGROUND ART**

A variable capacity store for elongated articles where an endless conveyor is subdivided into an active path and a passive path is previously known from EP 738478. EP 738478 discloses a variable-capacity store for elongated articles. The store comprises an input station and an output station located in series along a path along which elongated articles are fed. The articles are fed by a single endless conveyor, which is subdivided into an active path and a passive path. The active path extends from the input station to the output station and the passive path extends from the output station to the input station. The active path is formed by a part of the endless conveyer, which is wound around a first set of drums in a first spiral. The passive path, or return branch, is formed by a part of the endless conveyor, which is wound around a second set of drums in a second spiral.

A drawback of the variable capacity store of the above type is that the transfer between the active path and passive path is performed at a single point, which is where the endless conveyer leaves the first spiral to enter the second spiral or vice versa, in dependence of whether the active path should

be lengthened or shortened. The friction between the drums and the endless conveyor will increase as the number of turns increases from the point of entrance where the active and passive paths are connected. This implies that, when trying to change the division between the active path and passive

5 path, by removing part of the active path from the passive path or by introducing part of the passive path into the active path, the tension of the chain will increase from the point of entrance where the active and passive paths are connected as the number of turns increases. When a reservoir is used in a process which has relatively large short term variations in the 10 capacity of a delivering device, which is arranged to feed the reservoir, and a receiving device, which is arranged to be fed by the reservoir, it is of importance that the capacity of the reservoir can be altered quickly. A limiting factor in this regard, is that the endless conveyor is designed to support a maximum tension. The tension in the endless conveyor is dependent on the 15 velocity of the change of length of the active and passive path. Since the tension in the endless conveyor increases as the number of turns increases, the maximum feed in- feed or feed out velocity from the active path will be determined from the tension in the chain at the last turn, calculated from the point of entrance. For a conveyor of a determined rigidity, there will be a 20 maximum number of turns allowed for a specific maximum feed in- feed or feed out velocity from the active path. If the designer would need more turns in order to create a larger variable capacity store, the designer would have to contemplate to make a more rigid conveyor, which in turn would increase the weight of the chain and thus require a complete redesign of the store.

25

#### DISCLOSURE OF INVENTION

One object of the invention is to provide a variable capacity store in which allow a freedom in design of the number of layers in an active path without a corresponding increase in tension of the chain as the number of turns 30 increases, such that the response to short term variations can be quick even for relatively large stores comprising a plurality of turns in the active path.

This object is achieved by a variable capacity store according to the characterising portion of claim 1. The invention relates to a variable capacity store comprising a set of conveyor means superpositioned on top of and connected to each other. Since a number of conveyor means are

5 superpositioned on top of each other, the capacity of the store can be designed by deciding how many layers should be used. Since each layer works independently from the other layers of the store, the addition of a layer does not alter the design of the layers already present in the store. This type of store can therefore be redesigned in order to meet changed requirements

10 of capacity only by adding a layer and replacing the input or output station of the store, depending on which side the additional layer is positioned. The other parts of the store do not need to be altered. Each layer is formed by a conveyor means.

15 The invention makes use of conveyor means includes an endless conveyor being arranged in a generally H-shaped pattern including two parallel elongated portions and a transverse portion, which is movable along said elongated portions. The H-shaped pattern is, by said transverse portion, divided into an active path positioned one side of the transverse portion and

20 a passive path positioned on the other side, wherein the capacity of the conveyor means is arranged to be varied by displacing the transverse portion and thereby increasing or decreasing the proportion between the active path and passive path.

25 Since the layers are formed by essentially a single endless conveyor, the tension in an endless conveyer in one layer will be independent of the tension in an endless conveyer in another layer. It is therefore possible to arrange a store with a multiplicity of layers without a corresponding increase in tension of the chain as the number of layers increases, such that the

30 response to short term variations can be quick even for relatively large stores comprising a plurality of layers.

The H-shaped endless conveyors are connected to each other by transfer means arranged between said active paths of conveyor means. The transfer means is preferably formed by a curved conveyor path extending from an end of an elongated portion on one side of a first generally H-shaped endless conveyor toward an end of an elongated portion on the opposite side of a second generally H-shaped endless conveyor positioned on top of said first generally H-shaped endless conveyor.

In a still further preferred embodiment the curved conveyor path is formed by an extension of the generally H-shaped endless conveyor in one or both of two interconnected conveyor means superimposed on top of and connected to each other.

In yet another preferred embodiment of the invention each transverse portion in the set of conveyor means is individually displaceable along the elongated portions of the H-shaped conveyor means, such that the capacity of each conveyor means in said set of conveyor means is controlled independently from the capacity of other conveyor means in said set. This embodiment is particularly advantageous since even if the drive for change of position of the transverse portion is stuck or becomes inoperative for some other reason, the capacity of the store will be variable, due to the variation of the capacity of the remaining layers.

The invention also relates to a variable store arrangement comprising a first and a second variable capacity store as described above. According to this embodiment the active paths together with the transfer means of the first variable capacity store forms a first conveyor path which is arranged to perform transportation of goods from one conveyor means to the next conveyor means in said set of conveyor means in a first direction. Furthermore, the active paths together with the transfer means of the second variable capacity store forms a second conveyor path which is arranged to perform transportation of goods from one conveyor means to the next

conveyor means in said set of conveyor means in a second direction opposite to said first direction.

5 In the embodiment, the active paths together with the transfer means of the second variable capacity store forms a second conveyor path which is arranged to perform transportation of goods from one conveyor means to the next conveyor means in said set of conveyor means in a second direction opposite to said first direction.

10 The elongated portions of the second variable capacity store are positioned between the elongated portions of the first variable capacity store and the transfer means of the second variable capacity store is positioned between the transfer means and the transverse portion of the second variable capacity store, whereby the first conveyor path is essentially circumventing the second 15 transportation path.

20 A variable store arrangement arranged as indicated above provides is very compact, by which is meant that a large amount of goods can be stored on a relatively small area, furthermore, the input and output to the store arrangement can be arranged at approximately the same height. This is an advantage, if a production in a factory is done in essentially a single plane. In this case, the need for a lift or a dropdown, which normally would follow a 25 variable capacity store where the input and output is arranged at different heights is removed.

25 Preferably, the generally H-shaped patterns of said first variable capacity store is vertically displaced from said generally H-shaped patterns of said second variable capacity store. By this arrangement, the transverse portions of respective first and second variable capacity store is prevented from 30 colliding with each other.

**BRIEF DESCRIPTION OF DRAWINGS**

Embodiments of the invention will be described in detail below, with references to the appended drawings, where:

5 Fig. 1 shows a top view of a conveyor means including an endless conveyor being arranged in a generally H-shaped pattern.

Fig. 2 shows a view form below of the conveyor shown in figure 1.

10 Fig. 3 shows a side view of a conveyor means including a drive means for a support for the transverse portion of the H-shaped conveyor means.

Fig. 4 shows a top view of the conveyor in fig 1, where the transverse portion is moved to an end position, wherein the storage capacity is at a minimum for the store and a first embodiment of transfer means for transferring goods from one layer to another layer in the set of H-shaped endless conveyors stacked on top of each other.

15 Fig. 5 shows an end view of a set of H-shaped conveyors stacked on top of each other, where transfer means are arranged to transfer the goods from one layer to another.

20 Fig. 6 shows a second embodiment of transfer means.

Fig. 7 shows a third embodiment of transfer means.

25 Fig. 8 shows a top view of an embodiment of a variable store, including an inner and an outer variable capacity store, where both variable capacity stores are full.

30 Fig. 9 shows a top view of an embodiment of a variable store, including an inner and an outer variable capacity store, where both variable capacity stores are full,

Fig. 10 show a perspective view of the outer variable store only,

Fig. 11 show a perspective view of the inner variable store only,

5 Fig. 12 shows a top view of an embodiment of a variable store, including an inner and an outer variable capacity store, where the outer variable capacity store is full and the inner variable capacity store is half full,

10 Fig. 13 shows a top view of an embodiment of a variable store, including an inner and an outer variable capacity store, where the outer variable capacity store is full and the inner variable capacity store is empty;

15 Fig. 14 shows a top view of an embodiment of a variable store, including an inner and an outer variable capacity store, where the outer variable capacity store and the inner variable capacity store are empty,

20 Fig. 15 shows a perspective view of an embodiment of a variable store arrangement including an inner and an outer variable capacity store.

#### MODE(S) FOR CARRYING OUT THE INVENTION

25

In figure 1 a top view of a conveyor means 1 is shown. The conveyor means 1 is intended to be used in a variable capacity store including a plurality of layers, each including a conveyor means 1, superimposed on top of each other. The conveyor means 1 includes an endless conveyor 2 being arranged

30 in a generally H-shaped pattern including two parallel elongated 3, 4 portions and a transverse portion 5. The endless conveyor 2 rests on a frame 6. The frame includes a first and a second parallel support rails 7, 8 and a transverse

support bar 9. The parallel support rails 7,8 are arranged to support the parallel elongated portions 3, 4 of the endless conveyor and the support bar 9 is arranged to support the transverse portion 5.

- 5 The transverse support bar 5 is movably arranged along the length of the parallel support rails 7,8. By movement of the transverse support bar 9, the position of the transverse portion of the endless conveyor 2 will be altered. Movement of the transverse support bar 9 is accomplished by a drive motor 10 (fig. 3), which engages a guide bar 11 extending in the same direction as the support rails 7,8. The transverse support 9 bar is slidably arranged in the support rails 7,9 by engagement of a notch (not shown) in a longitudinally extending groove 12 (fig 3) in a side portion of the support rail 7,8. In order to limit the movement of the transverse support bar 9 end stops 16, 17 can be provided at respective end of the guide bar 11.
- 10
- 15

- 15 The endless conveyor 2 is by said transverse portion 5, divided into an active path A positioned one side of the transverse portion and a passive path P positioned on the other side. The endless conveyor 2 enters at a first end 20 of the first support rail, where, according to the embodiment shown in figure 1, the conveyor 2 is flexed, from running on the bottom side 14 of the first support rail 7, to run in the opposite direction on the top side 13 of the first support rail 7. The conveyor 2 runs toward the transverse support bar 9, which supports a curved transverse portion 21 of the conveyor 2. The curved transverse portion 21 of the conveyor 2 can be arranged in a manner known to the skilled in the art, for example via a curved track or by locally flexing the conveyors at the ends of the transverse support bar 9. The conveyor leaves the transverse support bar 9 to be supported by the second support rail 8.
- 20
- 25

- 30 The conveyor further extends toward a first end 22 of the second support rail 8, where the conveyor 2 is flexed from running on the top side 13 of the second support rail 8 to run in the opposite direction on the bottom side 14 of the second support rail 8. The conveyor further runs on the bottom side 14 of

the second support rail 8 toward a second end portion 23 of the second support rail 8, where the conveyer 2 is flexed, from running on the bottom side 14 of the second support rail 8, to run in the opposite direction on the top side 13 of the second support rail 8. The conveyer 2 further runs toward the 5 transverse support bar 9, where a flexed transverse portion 24 of the conveyer 2, which is included in the passive path P, it is flexed toward the first support rail 7. The flexed transverse portion 24 of the conveyer 2 can be arranged in a manner known to the skilled in the art, for example by locally 10 flexing the conveyers by roller wheels 25, 26 at the ends of the transverse support bar 9 as shown in the embodiment shown in fig. 1 or via a curved track. Leaving the flexed transverse portion 24, the conveyer 2 further extends toward a second end 27 of the first support rail 7. At the second end 15 27 of the first support rail, the conveyer is flexed from running on the top side 13 of the first support rail 7 to run in the opposite direction on the bottom side 14 of the first support rail 7. The conveyer further runs on the bottom side 14 of the first support rail 7 toward the first end portion 20 of the first support rail 7, where the conveyer 2 is flexed, from running on the bottom side 14 of the first support rail 7, to run in the opposite direction on the top side 13 of the first support rail 7, where it first entered.

20 The transverse support bar supports the curved transverse portion 21 and the flexed transverse portion 24 of the conveyer. The active path A includes the portion of the conveyor 2 extending from the first end 20 of the first support rail 7 to the first end 22 of the second conveyer 8. The active path A 25 also includes the curved transverse portion 21. Furthermore the active path A includes transfer means 19 (figs. 4 – 7) connecting active paths of conveyor means of different layers of conveyor means.

30 The passive path P includes the portions 28, 29 (fig 2) of the conveyor 2 which extends along the bottom side 14 of the first and second support rails 7,8. Furthermore, the passive path P includes the portion of the conveyor which extends from the second end 23 of the second support rail 8 to the

second end 27 of the first support rail 7. This portion includes the flexed portion 24, which is carried by the transverse support bar.

By changing the position of the transverse support bar 9 along the support rails 7,8, the relative proportion between the active path A and passive path P is changed.

In figure 2, the conveyer means shown in figure 1 is shown from a view below. The bottom side 14 of the first and second support rails 7,8 carries portions 28, 29 of the conveyer, which form part of the passive path P. Furthermore the guide bar 11 extending along the length of the support rails 7,8 is shown. The bottom side of the transverse support bar 9 carries a drive motor 15 for changing the position of the transverse support bar 9 via engagement to a guide bar 11.

In figure 4 a top view of the conveyor in fig 1 is shown, where the transverse support bar 9 is moved to an end position E, wherein the storage capacity is at a minimum for the store. Furthermore a first embodiment of transfer means 19 for transferring goods from one layer to another layer in the set of H-shaped endless conveyors stacked on top of each other is attached at an end 30 of the conveyer means 1 on which the active path A is situated. In the shown embodiment the transfer means 19 is formed by a separate curved conveyor, which preferably is arranged as an endless conveyor. The transfer means 19 is attached to outgoing portion of the endless conveyor 2 where, that is at the first end 22 of the second support rail 8, where a transfer from the active path A on the top side 13 of the second support rail 8 to the passive path P on the bottom side 14 occurs. The transfer means, which is included in the active path A, lead toward the first end 20' of the first support rail 7' of a conveyer means 1'positioned on top of the conveyer means 1 shown in figure 4.

In figure 5 an end view of a set of conveyer means, including a first- 1, a second- 1', a third 1" and a fourth- 1''' conveyor means, which are positioned on top of each other are shown. A first, second and third transfer means 19, 19', 19'' are arranged for connecting the active paths A, A', A'', A''' of respective conveyer means.

In figure 6 a first alternative embodiment of the transfer means 19 is shown. Here the second support rail 8 is extended and comprises a curved portion 31. The curved portion 31 is also inclined upwards in a vertical direction such that it connects the incoming end 20' of the first support rail 7' in a conveyor means 1' positioned on top of the conveyor means 1, which carries the curved portion. The first end 22 of the second support rail is adjoined to the first end 20' of the first support 7' of the conveyor means 1' such that a transfer from a first conveyor means 1 to a second conveyor means 1' positioned on top of said first conveyor means is possible.

In stead of extending the second support rail 8 it is possible to prolong the first support rail. In this case the first support rail 7' of the second conveyer means 1' would be extended and would comprise a curved portion. The curved portion would be inclined downwards in a vertical direction such that it connects the outgoing end 22 of the second support rail 8 in a conveyor means 1 positioned below the conveyor means 1', which carries the curved portion.

Figure 7 show a third embodiment of the transfer means 19. According to this embodiment both the first guide rail 7' of a second conveyer means 1' and the second guide rail 8 of the first conveyor means are extended to include curved portions 32, 33. The curved portions are positioned such that the connect each other such that transfer between respective conveyor means are possible.

According to the invention the transfer means can be either formed as separate means such as shown in figure 4 or by extension of the first guide rail, the second guide rail or both the first and second guide rail in a manner so as to connect the outgoing end of a conveyor means with an incoming end

5 in another conveyor means positioned on top. An incoming end is an edge portion of a conveyor means where an endless conveyor flexes from the bottom off a guide rail to the top of the guide rail at a position where the conveyor on the topside is running from the edge.

10 Figure 8 shows a variable capacity store 34 according to the invention in use as a variable capacity store for elongated articles. The store is fed with elongated articles, in particular tobacco products from a manufacturing unit 35. The elongated articles are elevated by an elevator unit 35' to the top level of the variable capacity store 34. The elongated articles enter the variable capacity store 34 at an input track 36, which in this example is positioned at the highest conveyor means 37" in a set of three conveyor means 37 – 37". In a preferred embodiment of the invention, the transverse portions 38 – 38" in said set of conveyor means 37 – 37" is individually displaceable along said elongated portion, such that the capacity of each conveyor means in said set of conveyor means is controlled independently from the capacity of other conveyor means in said set. In the example shown the lowest conveyor is positioned such that the active path is as large as possible, while the two remaining transverse portions are positioned midways. Naturally, the invention also contemplates the possibility to run the transverse portions in pairs or altogether fixed together for simultaneous movement. However, according to the most preferred embodiment the transverse portions are individually moveable for maximum flexibility of the storage capacity.

30 The positions of the transverse portions 38- 38 " are controlled by drive units connected to guide rails as explained in connection with fig 3. Respective endless conveyor are driven by a single drive unit (not shown) or by a single

drive unit which is connected to respective endless conveyer by a transmission.

5 The goods leaves the variable capacity store at an output station 39, which in the shown example is positioned at the bottom of the variable capacity store. From the output station the goods enters a packing machine 40.

10 In figure 9 a top view of an embodiment of a variable store, including an inner variable capacity store 100 and an outer variable capacity store 101 is shown. In figure 10 it is shown how the active paths 102, 102', 102" together with the transfer means 103, 103', 103" of the first outer variable capacity store 101 forms a first conveyor path 104. The first transport path 104 is arranged to perform transportation of goods from one conveyor means 105 to the next conveyor means 105' etc. in a set (105 – 105") of conveyor means 15 in a first direction indicated with arrow 106 in an upward route of track. Each transport means (105 – 105') and the transfer means 103, 103', 103" between the transport means are arranged in the manner described above. The set (105 – 105") of conveyor means includes an infeed track 107, where goods are delivered to the variable capacity store, and an exit path 108, which leads 20 to an inner variable capacity store 100.

25 In figure 11 it is shown how the active paths 109, 109', 109" together with the transfer means 110, 110', 110" of the second inner variable capacity store 100 forms a second conveyor path 111. The second conveyor path 111 is arranged to perform transportation of goods from one conveyor means 112" to the next conveyor means 112' in a set of conveyor means (112 – 112") in a second direction opposite to said first direction in a downward route of track. The second direction is indicated with an arrow 113. Each transport means (112 – 112") and the transfer means 110, 110', 110" between the 30 transport means are arranged in the manner described above. The set (112 – 112") of conveyor means includes an infeed track 114 which receives goods

from the outer variable capacity store 101 and an exit track 115, where goods are delivered from the variable capacity store.

- The first outer variable capacity store includes elongated portions 116, 117.
- 5 The second inner variable capacity store includes similar elongated portions 118, 119. The elongated portions 118, 119 of the second inner variable capacity store 100 are positioned between the elongated portions 116, 117 of the first variable capacity store 101.
- 10 Furthermore the transfer means 110 of the second inner variable capacity store 101 is positioned between the transfer means 103 and the transverse portions 120 – 120" of the first outer 101 variable capacity store.

15 The first conveyor path is thus essentially circumventing the second transportation path.

Figures 12 – 14 show a top view of an embodiment of a variable store, including an inner and an outer variable capacity store, where the inner and outer capacity stores are filled to different levels.

20 Figure 15 show a perspective view of a variable store, including an inner and an outer variable capacity store.

Figures 12 – 15 includes the same features as explained in relation to figures 25 9 – 11 and will therefore not be described in full detail.

The invention shall not be restricted to the embodiments described above, but can be varied within the scope of the appended claims.

## CLAIMS

1 A variable capacity store comprising a set of conveyor means superpositioned on top of and connected to each other, characterised in that each conveyor means includes an endless conveyor being arranged in a generally H-shaped pattern including two parallel elongated portions and a transverse portion, which is movable along said elongated portions, wherein said H-shaped pattern is, by said transverse portion, divided into an active path positioned one side of the transverse portion and a passive path positioned on the other side, wherein the capacity of the conveyor means is arranged to be varied by displacing the transverse portion and thereby increasing or decreasing the proportion between the active path and passive path.

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3 A variable capacity store according to claim 1; characterised in that said H-shaped endless conveyors are connected to each other by transfer means connecting active paths of different conveyor means.

3 A variable capacity store according to claim 2, characterised in that said transfer means is formed by a curved conveyor path extending from an end of an elongated portion on one side of a first generally H-shaped endless conveyor toward an end of an elongated portion on the opposite side of a second generally H-shaped endless conveyor positioned on top of said first generally H-shaped endless conveyor.

4 A variable capacity store according to claim 3, characterised in that said curved conveyor path is formed by an extension of said endless conveyor forming a generally H-shaped endless conveyor in one or both of two interconnected conveyor means

superpositioned on top of and connected to each other.

5 A variable capacity store according to any of the preceding claims, characterised in that each transverse portion in said set of conveyor means is individually displaceable along said elongated portion, such that the capacity of each conveyor means in said set of conveyor means is controlled independently from the capacity of other conveyor means in said set.

10 6 A variable store arrangement comprising a first and a second variable capacity store according to any of claims 1 – 5 , wherein the active paths together with the transfer means of the first variable capacity store forms a first conveyor path which is arranged to perform transportation of goods from one conveyor means to the next conveyor means in said set of conveyor means in a first direction, the active paths together with the transfer means of the second variable capacity store forms a second conveyor path which is arranged to perform transportation of goods from one conveyor means to the next conveyor means in said set of conveyor means in a second direction opposite to said first direction, the elongated portions of the second variable capacity store are positioned between the elongated portions of the first variable capacity store and the transfer means of the second variable capacity store is positioned between the transfer means and the transverse portion of the second variable capacity store, whereby the first conveyor path is essentially circumventing the second transportation path.

15 20 25 30 7 A variable store arrangement according to claim 6, characterised in that said generally H-shaped patterns of said first variable

capacity store is vertically displaced from said generally H-shaped patterns of said second variable capacity store.

**ABSTRACT****A VARIABLE CAPACITY STORE FOR ELONGATED ARTICLES**

A variable capacity store comprising a set of conveyor means superpositioned on top of and connected to each other. The conveyor means includes an endless conveyor (2) being arranged in a generally H-shaped pattern including two parallel elongated portions (3, 4) and a transverse portion (5), which is movable along said elongated portions.

Fig. 1

1/12

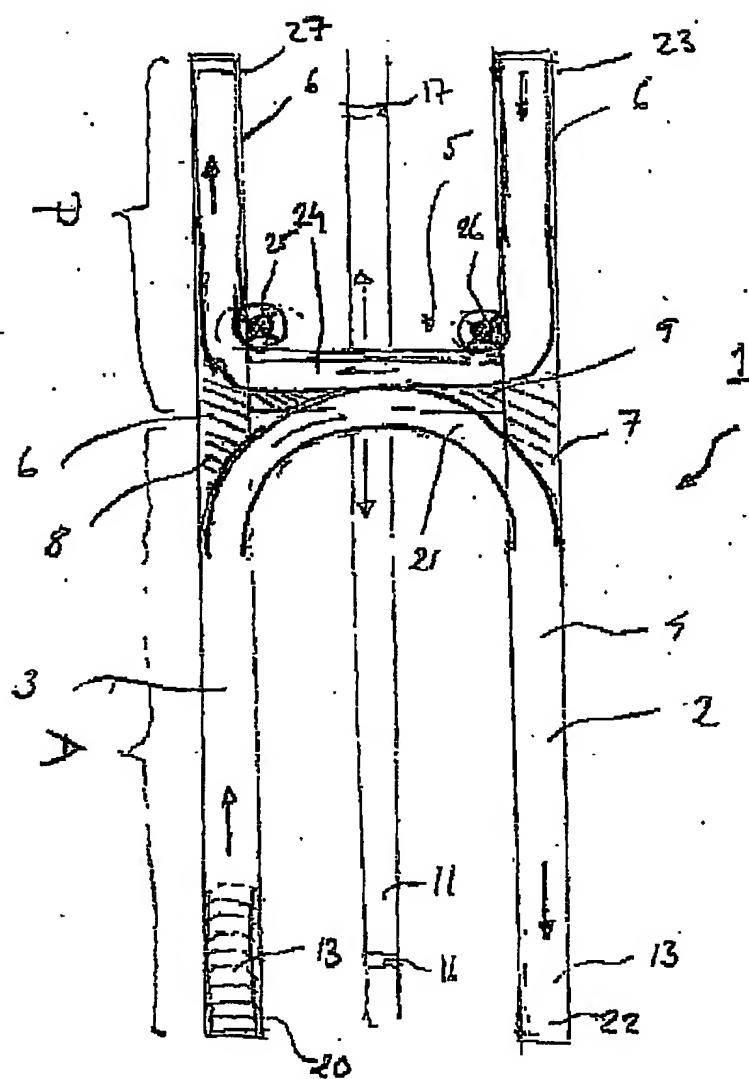
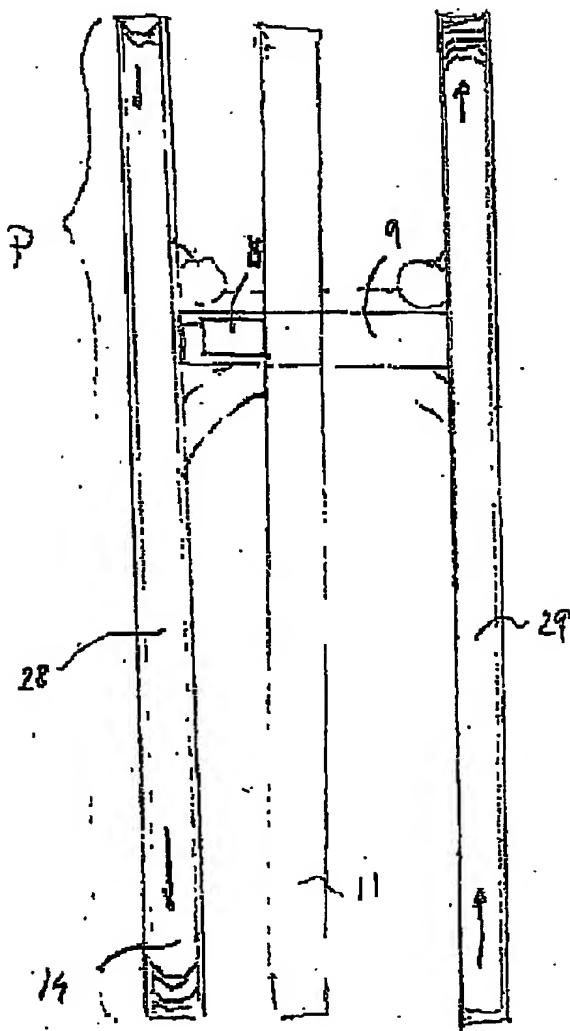
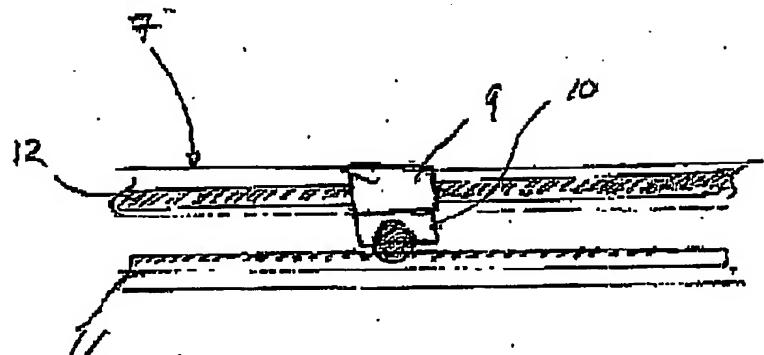


Fig. 2



2/12 F. 3



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Fig. 4.

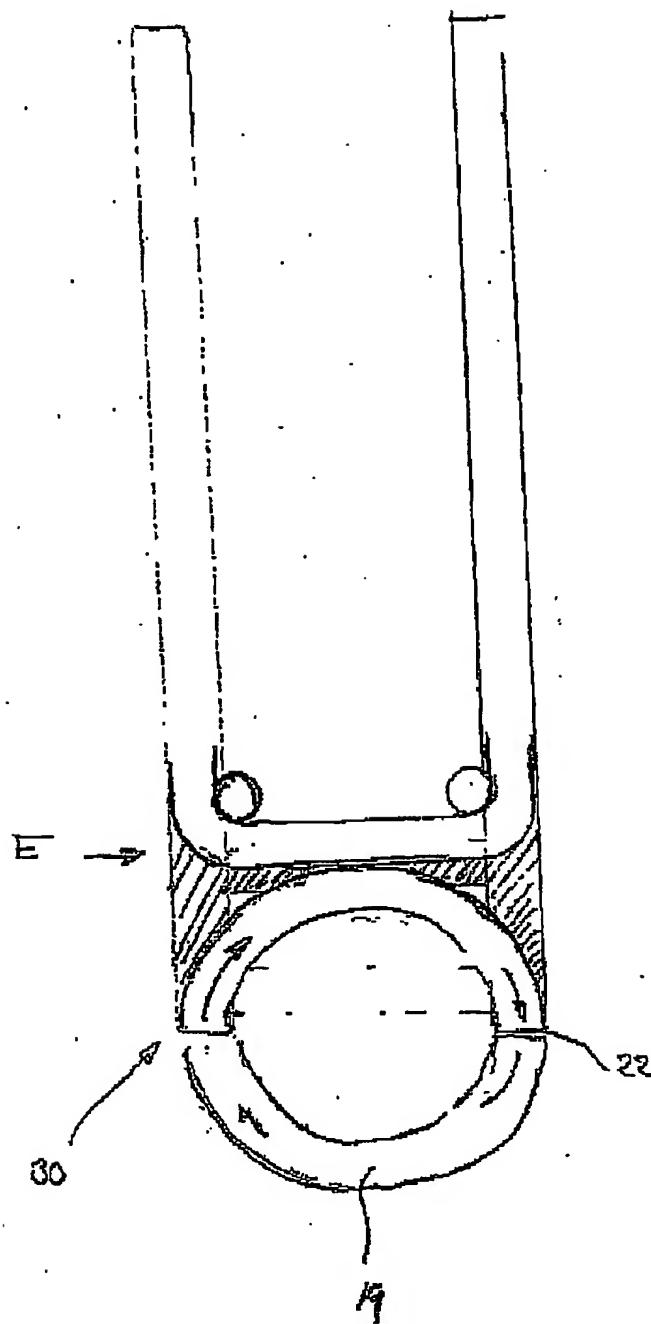
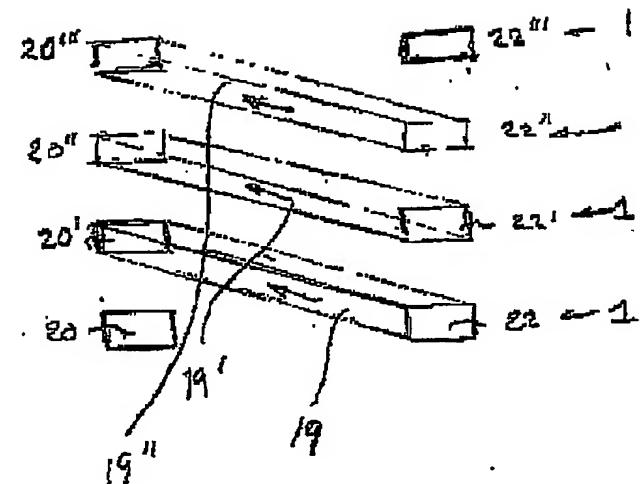


Fig 5



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Fig. 6

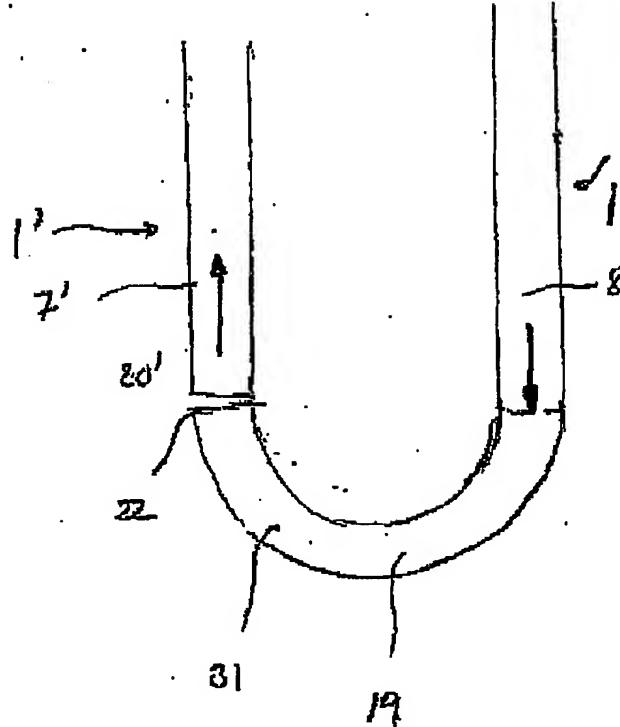
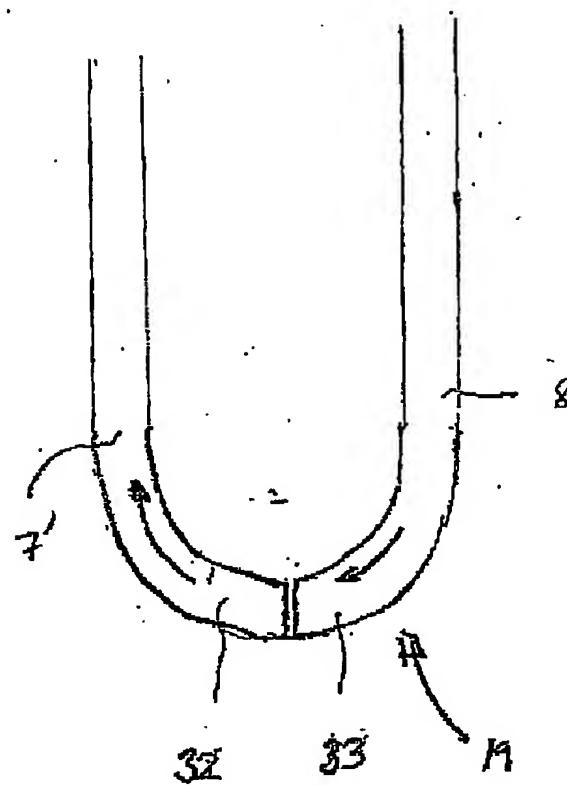


Fig. 7



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8

Fig.

# FIFO Flat cell Example

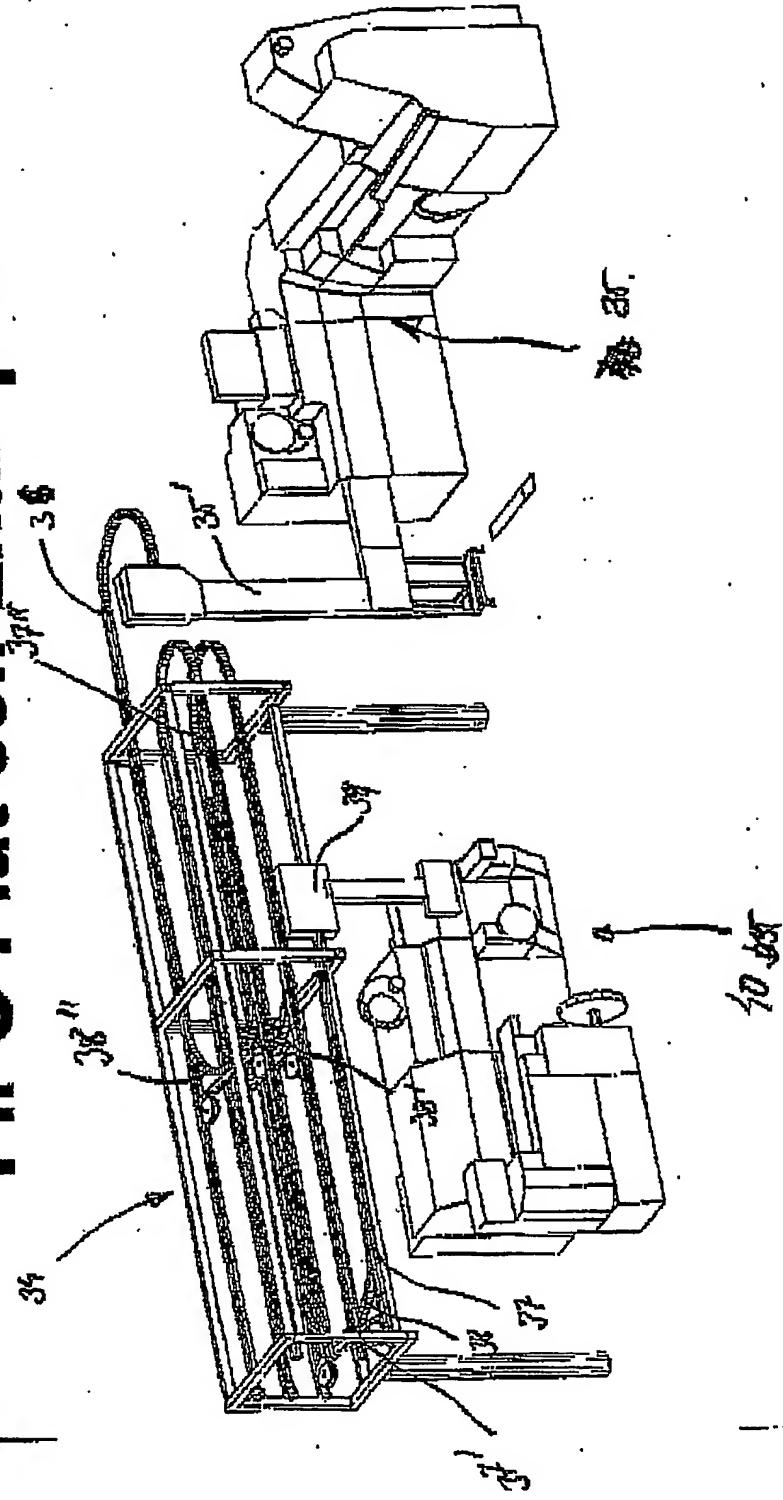
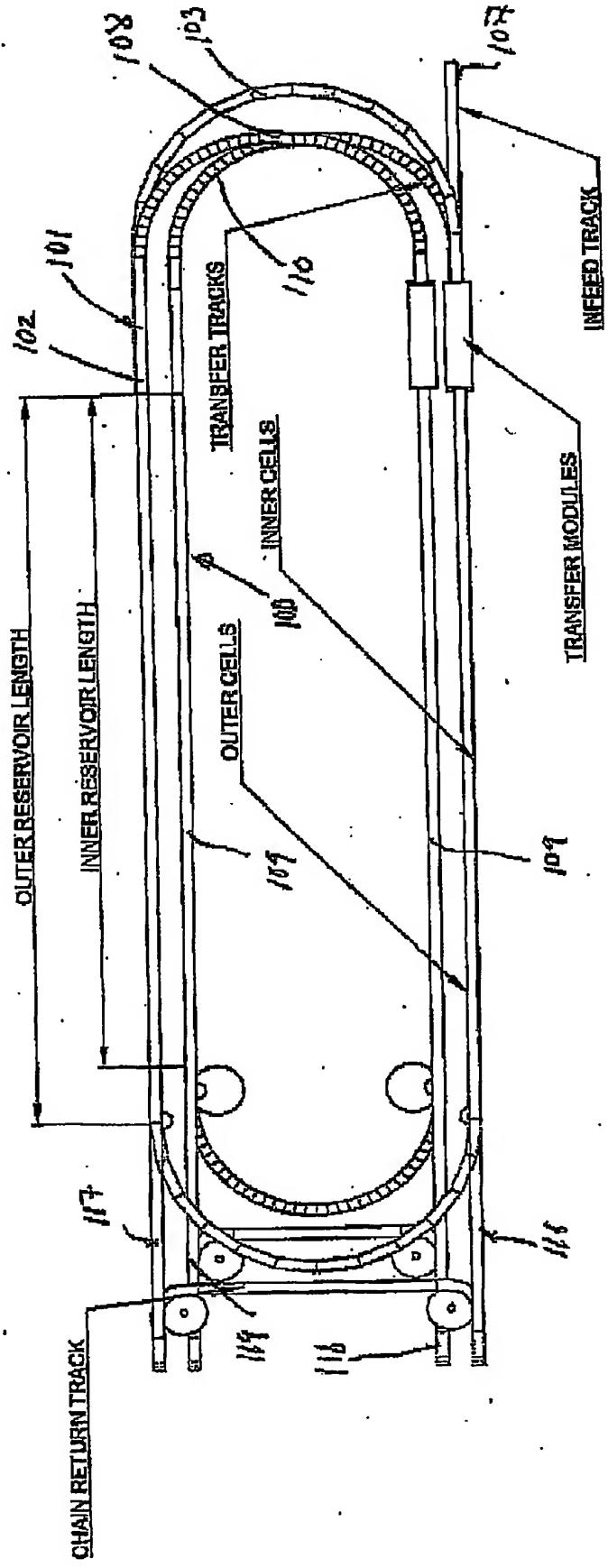


FIG 9



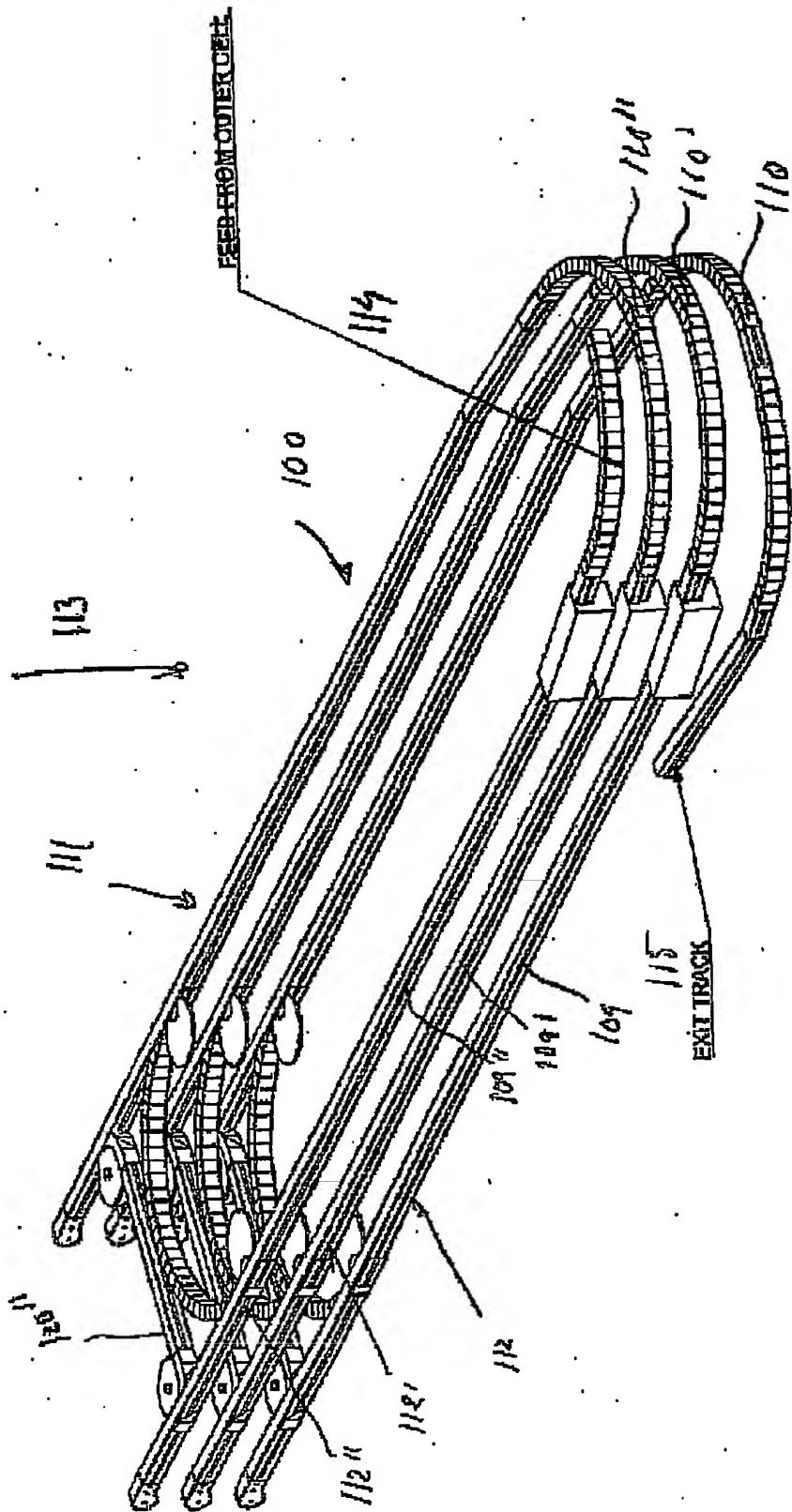
Note:  
 OUTER CELLS FULL  
 INNER CELLS FULL

PROPOSAL DRAWING FOR  
 INFORMATION ONLY

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7	1	8	1
9	1	10	1
11	1	12	1
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657	1	658	1
659	1	660	1
661	1	662	1
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Note: INNER CELLS ONLY, SHOWING DOWNWARD ROUTE OF TRACK

**PROPOSAL DRAWING FOR  
INFORMATION ONLY**

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ENTR INNER CELLS

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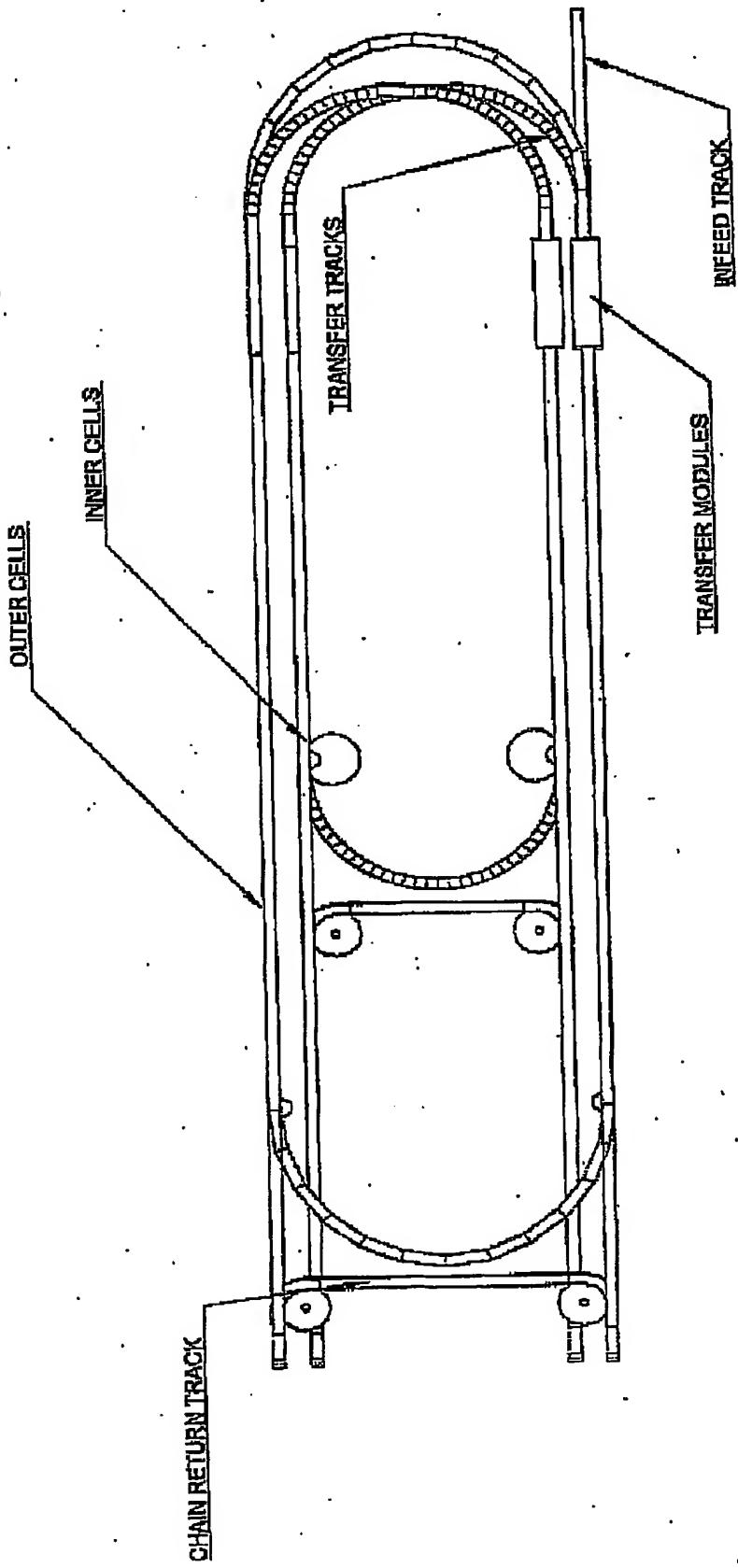
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Fig 12



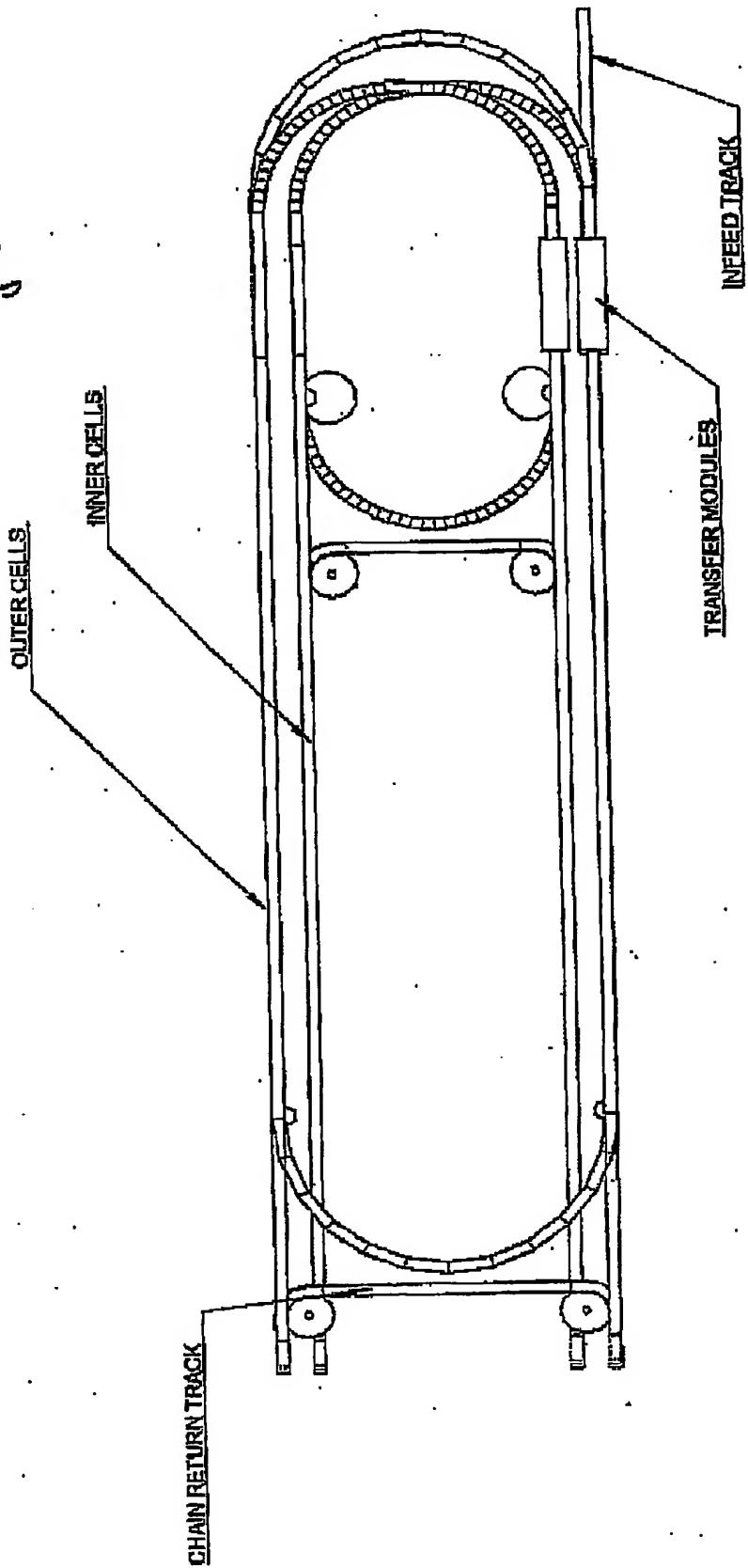
Note:  
OUTER CELLS FULL  
INNER CELLS MIDWAY

PROPOSAL DRAWING FOR  
INFORMATION ONLY

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5	-	6	-
7	-	8	-
9	-	10	-
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699	-	700	-
701	-	702	-
703	-	704	-
705	-	706	-
707	-	708	-
709			

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Fig 13



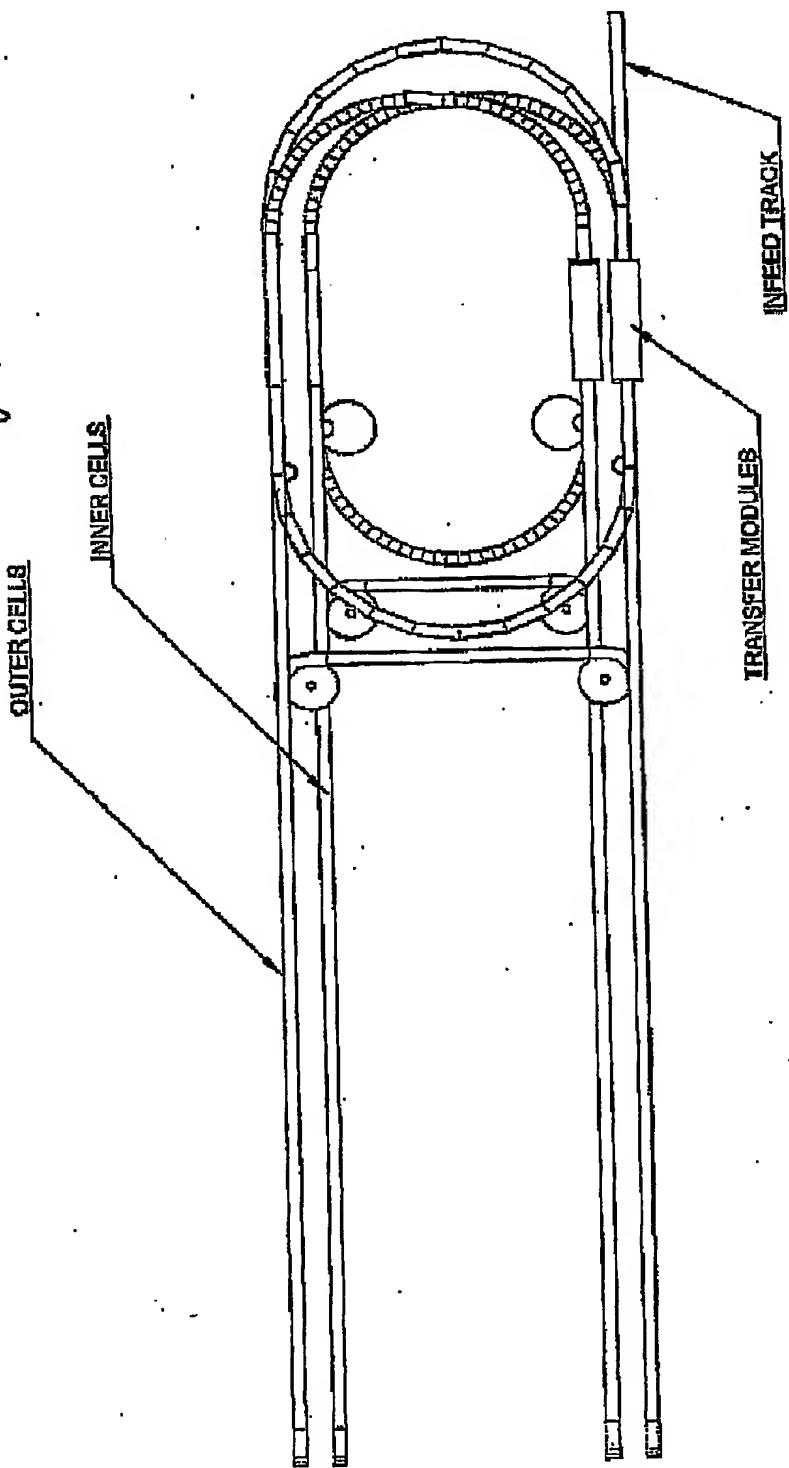
Note:  
**OUTER CELLS FULL**  
**INNER CELLS EMPTY**

**PROPOSAL DRAWING FOR**  
**INFORMATION ONLY**

GENERAL		INFEED SYSTEM		PLAN VIEW		INTERCELL EMPTY	
Mark 1	Mark 2	Mark 1	Mark 2	Mark 1	Mark 2	Mark 1	Mark 2
1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56
57	58	59	60	61	62	63	64
65	66	67	68	69	70	71	72
73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88
89	90	91	92	93	94	95	96
97	98	99	100	101	102	103	104

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Fig 17

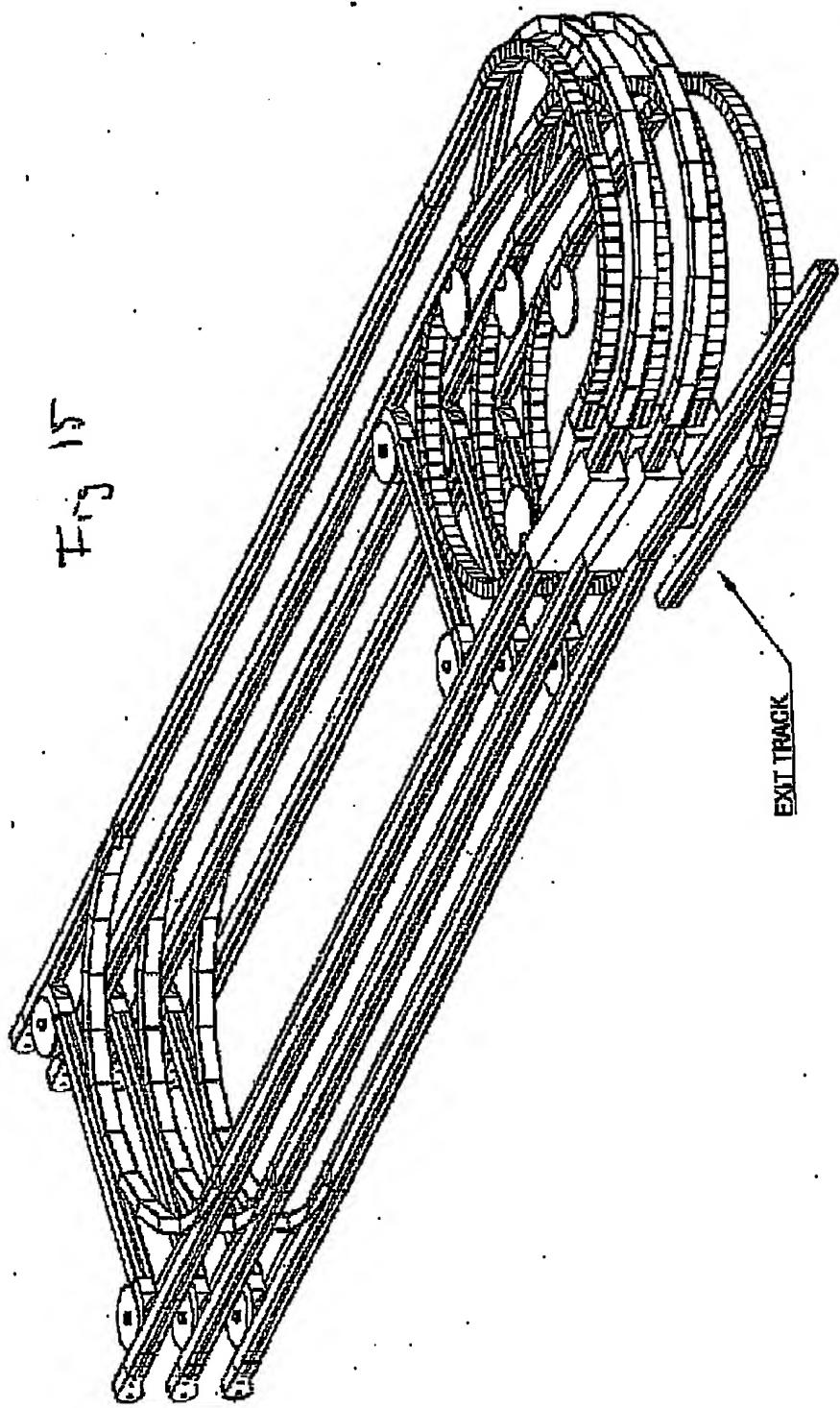


Note:  
 OUTER CELLS EMPTY  
 INNER CELLS EMPTY

PROPOSAL DRAWING FOR  
 INFORMATION ONLY

DRAWING NUMBER		DRAWING TITLE		SCALE		REVISION	
1000		DUSTLESS FIFE SYSTEM PLAN VIEW INNER AND OUTER CELLS EMPTY		1:50		A	
<b>FIG 17</b>							
1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56
57	58	59	60	61	62	63	64
65	66	67	68	69	70	71	72
73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88
89	90	91	92	93	94	95	96
97	98	99	100	101	102	103	104

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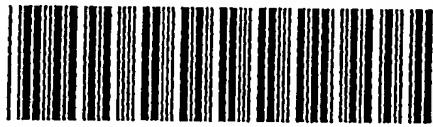


Note:  
OUTER CELLS FULL  
INNER CELLS EMPTY

PROPOSAL DRAWING FOR  
INFORMATION ONLY

INFEED SYSTEM		OUT FEED SYSTEM	
REVERSE POINTS		3D VIEW	
1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16
17	18	19	20
21	22	23	24
25	26	27	28
29	30	31	32
33	34	35	36
37	38	39	40
41	42	43	44
45	46	47	48
49	50	51	52
53	54	55	56
57	58	59	60
61	62	63	64
65	66	67	68
69	70	71	72
73	74	75	76
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85	86	87	88
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93	94	95	96
97	98	99	100
101	102	103	104
105	106	107	108
109	110	111	112
113	114	115	116
117	118	119	120
121	122	123	124
125	126	127	128
129	130	131	132
133	134	135	136
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213	214	215	216
217	218	219	220
221	222	223	224
225	226	227	228
229	230	231	232
233	234	235	236
237	238	239	240
241	242	243	244
245	246	247	248
249	250	251	252
253	254	255	256
257	258	259	260
261	262	263	264
265	266	267	268
269	270	271	272
273	274	275	276
277	278	279	280
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293	294	295	296
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469	470	471	472
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497	498	499	500
501	502	503	504
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509	510	511	512
513	514	515	516
517	518	519	520
521	522	523	524
525	526	527	528
529	530	531	532
533	534	535	536
537	538	539	540
541	542	543	544
545	546	547	548
549	550	551	552
553	554	555	556
557	558	559	560
561	562	563	564
565	566	567	568
569	570	571	572
573	574	575	576
577	578	579	580
581	582	583	584
585	586	587	588
589	590	591	592
593	594	595	596
597	598	599	600
601	602	603	604
605	606	607	608
609	610	611	612
613	614	615	616
617	618	619	620
621	622	623	624
625	626	627	628
629	630	631	632
633	634	635	636
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641	642	643	644
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649	650	651	652
653	654	655	656
657	658	659	660
661	662	663	664
665	666	667	668
669	670	671	672
673	674	675	676
677	678	679	680
681	682	683	684
685	686	687	688
689	690	691	692
693	694	695	696
697	698	699	700
701	702	703	704
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709	710	711	712
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717	718	719	720
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741	742	743	744
745	746	747	748
749	750	751	752
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757	758	759	760
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765	766	767	768
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773	774	775	776
777	778	779	780
781	782	783	784
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793	794	795	796
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809	810	811	812
813	814	815	816
817	818	819	820
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833	834	835	836
837	838	839	840
841	842	843	844
845	846	847	848
849	850	851	852
853	854	855	856
857	858	859	860
861	862	863	864
865	866	867	868
869	870	871	872
873	874	875	876
877	878	879	880
881	882	883	884
885	886	887	888
889	890	891	892
893	894	895	896
897	898	899	900
901	902	903	904
905	906	907	908
909	910	911	912
913	914	915	916
917	918	919	920
921	922	923	924
925	926	927	928
929	930	931	932
933	934	935	936
937	938	939	940
941	942	943	944
945	946	947	948
949	950	951	952
953	954	955	956
957	958	959	960
961	962	963	964
965	966	967	968
969	970	971	972
973	974	975	976
977	978	979	980
981	982	983	984
985	986	987	988
989	990	991	992
993	994	995	996
997	998	999	1000

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